



THE
INSTITUTE
FOR
FISHERIES
RESOURCES



☐ Southwest Office
P.O. Box 29196
San Francisco, CA
94129-0196 USA
Tel: 415/561-FISH
Fax: 415/561-KING

☐ Northwest Office
P.O. Box 11170
Eugene, OR
97440-3370 USA
Tel: 541/689-2000
Fax: 541/689-2500

Mr. Bruce Halstead
US Fish and Wildlife Service
1125 16th Street, Room 209
Arcata, CA 95521

14 November 1998
Fax: (707)822-8411

Mr. John Munn
California Dept of Forestry
1416 Ninth Street
Sacramento, CA 95814

Fax: (916)653-8957

RE: PRT-828950 and 1157; SYP 96-002

Dear Mr. Halstead and Mr. Munn:

These are the supplemental comments of the Institute for Fisheries Resources (IFR) and the Pacific Coast Federation of Fishermen's Associations (PCFFA) on the Pacific Lumber Company (PALCO) proposed Habitat Conservation Plan and Sustained Yield Plan (HCP/SYP) as referenced above. These comments are in addition to, and intended to supplement, our joint comments submitted with other parties which provide a more extensive and detailed technical analysis. These separate and supplemental comments will address primarily the weaknesses in the aquatics and riparian protection measures in the HCP/SYP, although we will touch on a number of other areas insofar as they relate to aquatics and riparian issues.

I. The Importance of These Watershed for Salmonids: Coho salmon populations in California have now gone from historic run sizes of around 400,000 in Northern California and Southern Oregon to less than 10,000 wild, naturally spawning coho -- a 98.5% reduction! As a result, coho salmon have been listed under the Federal Endangered Species Act (ESA) since May 6, 1997 (62 Fed. Reg. 24,588). *The last, best refuge areas for coho salmon still existing in Northern California are on these PALCO lands.* Protection of these key refuge areas is crucial to any future recovery efforts to rebuild Northern California stocks. Furthermore, any future degradation of the stream systems upon which these key stocks depend -- as for instance, increased sediment and temperature resulting for timber operations upstream -- could in fact

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The Institute for Fisheries Resources is a Non-Profit, Non-Governmental Organization, affiliated with the Pacific Coast Federation of Fishermen's Associations, working for sustainable fisheries.

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jeopardize the future existence of the coho salmon within this entire ESU.

Section 10(a)(B)(ii) & (iv) of the ESA (16 U.S.C §1539(a)(B)(ii) & (iv)) requires that no HCP can be approved without a finding by the Secretary that:

“(ii) the applicant will, to the maximum extent practicable, minimize and mitigate the impacts of such taking;

.....
“(iv) the taking will not appreciably reduce the likelihood of the survival and recovery of the species in the wild.”

On review, it is clear that the measures proposed in the HCP do not in fact minimize or mitigate the impacts of such taking on coho salmon (or for that matter on the northern spotted owl or the marbled murrelet) to the “maximum extent practicable.” In fact, these measures, if implemented, would appreciably reduce the likelihood of both the survival and the ultimate recovery of these species in the wild, and would in fact contribute significantly to the ultimate extinction of at least coho salmon in Northern California, and possibly other species as well.

Likewise PALCO lands covered by this HCP/SYP contain important wild chinook runs, as well as wild steelhead and cutthroat runs of major biological importance (See HCP Map 16 -- Fish Distribution). All of these wild stocks are under consideration for future listing under the ESA. All are currently seriously depressed, primarily as a result of widespread freshwater habitat loss including the impacts of timber operations throughout their coastal range.

Additionally, the PALCO HCP/SYP utterly ignores the enormous environmental and economic costs of its past practices, particularly those that have contributed to the destruction of the commercial fishing industry through the near extinction of coho salmon on its properties. Destruction of the coastal salmon fishery has created tremendous economic as well as ecological dislocation. Nearly 40,000 fishing jobs have vanished from the North Coast in the past few decades as salmon stocks have declined. In every case these declines are linked to inland land uses that destroy salmon spawning and rearing habitat. Pacific Lumber's SYP clearly fails to give adequate "consideration to environmental and economic values" in violation of 14 CCR 1091.1(b), nor does it acknowledge the impact of PALCO's past practices in exacerbating these declines. The Draft Environmental Impact Statement/Environmental Impact Report concerning the Headwaters agreement similarly fails to analyze the economic costs of salmon freshwater habitat destruction, or the potential economic benefit of a recovered fishery. The PALCO HCP/SYP in fact appears to deliberately exclude the appropriate baseline data by which the economic and environmental adverse impacts of its own past and current land management practices could be assessed.

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As an overall comment, the HCP/SYP plan is seriously scientifically, legally and biologically deficient in a number of respects as more fully outlined below. The Plan should not be approved by either the California Department of Forestry nor by the appropriate federal agencies without substantial improvements. Among other serious problems, we note the following major problems:

I. The Watershed Assessment data for the HCP/Sustained Yield Plan is incomplete, outdated, and in some cases materially misleading. The SYP should not be approved in the absence of current and accurate data describing the condition of watersheds on Pacific Lumber land as well as appropriate baseline data by which the impacts of PALCO timber operations could be assessed. However, in many instances the HCP/SYP contains data that is incomplete or appears deliberately misleading.

The Bear Creek watershed, where Pacific Lumber has logged extensively in the past few years, provides an excellent example of misleading and incomplete data. During heavy rains in the first hours of 1997, a massive landslide and debris torrent originating on a recent PALCO logging operation roared down the creek, burying nearly four miles of recovering salmon habitat. Of 84 habitat restoration structures placed in the creek during previous years (most at taxpayer expense), all but one were buried or swept away by the debris torrent. Shade cover within the streamside (or "riparian") zone was also completely stripped. When the storm cleared, Bear Creek had been changed into a concrete-like gravel flat where a shallow stream meandered back and forth in full sunlight -- lethal conditions for salmon.

Pacific Lumber's HCP/SYP, however, acts like this event never happened. The stream survey data for Bear Creek in the plan is several years old, and shows a high percentage of pools and shade cover, neither of which currently exist. Temperature and sediment data for 1997 is curiously missing. Most troubling of all is the fact that most of the instream restoration structures in Bear Creek are described as "functioning" in a survey by PALCO dated April 25, 1997 -- nearly five months after the debris torrent destroyed all but one of these structures. The Bear Creek debris torrent originated on a failed landing and on a steep sloped clearcut block high upstream, in an area that would not be protected under any measure proposed by the current HCP. A later study of the Bear Creek watershed commissioned by Pacific Lumber and carried out by Pacific Watershed Associates revealed that 85% of the sediment in the watercourse after the torrent came from the 37% of the watershed that was logged in the previous five years. The Bear Creek is but one of several examples of how the data on which the SYP is based is incomplete, inaccurate and even intentionally misleading. These dramatic statistics also clearly show the necessity for protective measures that extend well beyond relatively narrow RMZs and into steep sloped areas at high risk of landslides.

Data from several independent and agency sources in fact indicates that many streams within

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the HCP/SYP Plan area are already experiencing severe sediment loading, higher than optimal temperatures for salmonids, and that many exceed TMDL sediment loading limits or are otherwise water quality limited. (See KRIS-PALCO CD Data Information System, Derksen 1998, ATTACHMENT 1). These stream impacts would be considerably exacerbated if the measures proposed in the HCP are allowed to proceed.

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II. The SYP Will Result in Liquidation, not a Sustainable Timber Harvest Over Time:

The Sustained Yield Plan proposes to harvest 32% more forest than will grow back over the first decade. This "decade," as defined by the plan, is oddly only four years long. During this four-year period, over 25% of the company's land would be intensively logged (54,382 acres). Over 35,000 of these acres will be clearcut, and over 2,500 of these acres are uncut old-growth forests. This is simply not a plan that will facilitate "sustained production of high-quality timber products...while giving consideration to environmental and economic values" as required under 14 CCR 1091.1(b), but a plan for the short-term liquidation of forest resources at a tremendous long-term environmental and economic cost.

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III. No Way to Mitigate for Loss of Aquatic Functions: Given the enormous ecological importance of old-growth and late seral stage forests to some 245 old-growth dependent species, including dozens which help maintain the integrity of aquatic functions, there really is no scientifically valid way to "mitigate" for the permanent destruction of the old-growth forests in question, particularly those areas upon which coho salmon depends for their survival and recovery. This plan would allow Pacific Lumber to liquidate over 17,000 acres of ancient and residual forest habitat, much of it along streams, and much of it crucial to the support and recovery of coho salmon and other depressed salmonid species. This level of widespread impact, in addition to the adverse impacts already endured by past timber operations, could well cause cumulative impacts which would "appreciably reduce the likelihood of the survival and recovery" of a growing number of ESA listed old-growth dependent species in violation of the federal Endangered Species Act (16 U.S.C. 1539 (a)(2)(B)(iv)). No riparian old-growth forests should be sacrificed under this HCP/SYP.

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Similarly, other measures PALCO proposes for "mitigating" the impacts of logging on aquatic habitat for coastal salmon are entirely inadequate. Interim buffer zones are far narrower than those recommended by independent scientists and supported in the literature, and a substantial amount of logging would be allowed to occur even within these buffers. The HCP proposed process for avoiding road failures and landslides relies primarily upon the analysis of a staff person of uncertain training and credentials to be hired by Pacific Lumber rather than on established (and more objective) landslide risk rating criteria applied by outside and independent consultants or agencies. Finally, even these interim measures are subject to change under an ill-defined and artificially constrained "watershed analysis" process that is itself wholly inadequate.

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IV. Inadequacy and Inability of Watershed Analysis Mechanism Proposed to Craft Required Aquatic Protections: The real heart of the aquatics strategy is a "watershed analysis" process that will determine how logging operations are to be conducted in every watershed on the property. Yet PALCO provides us very few details about how this crucial analysis is to be done. Discussion of this process occupies less than ten pages of the HCP, and very few indications are given as to what the final results of the process might be. Thus rather than any firm mitigation standards, we are left only with a vague "agreement to agree" based on some form of watershed analysis.

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It is questionable whether the proposed watershed analysis process will be meaningful. Unfortunately, PALCO's proposed watershed analysis process is very tightly constrained and pre-biased in numerous ways towards minimal protections -- thus it is doubtful that either a credible analysis of watershed conditions or a regime of truly protective prescriptions could ever emerge from its implementation.

For example, "maximum buffer width" sideboards are placed on prescription development from the outset, drastically limiting the protective measures that might emerge from any watershed analysis process. These maximums state that buffer zones along Class I streams may not be widened beyond the 170 feet already provided under the interim measures, although logging restrictions in this buffer may be increased. Similarly, Class II buffers may not exceed 130 feet, though with similar logging restrictions within this narrow buffer possible through the process. Provisions for steep, seasonal Class III watercourses are not mentioned -- and thus, by implication, they will have no buffer protections in spite of their importance on the landscape as sources of water, organic matter and sediment. Finally, the strategy for mass wasting avoidance differs from the interim strategy primarily in that a geologist from the California Division of Mines and Geology may make the final determination regarding logging and road-building on sites of extreme, very high or high mass wasting potential if other agencies and Pacific Lumber disagree.

In other words, regardless of what may be deemed necessary by scientists for the prevention of extinction and the ultimate recovery of salmonids now or in the future, for the overall protection of aquatic resources or for any other purpose, riparian buffers under the PALCO scheme could never be any larger than these maximums. Any prescriptions stronger than these "maximum sideboards" would have to be voluntarily developed and agreed to by Pacific Lumber, an event that is hardly likely.

Although the watershed analysis process also contains "minimum sideboards," these are largely based on California's current Forest Practice Rules which have utterly failed to slow the decline of salmon and steelhead populations on timberlands all along the California coast. The California Forest Practice Rules in fact allow extensive logging even within so-called "Watercourse and

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Lake Protection Zones (WLPZs)," and do very little to address problems associated with mass wasting or cumulative impacts. The only key difference between the HCP's minimum buffer widths and the current Forest Practice Rules is that a "no-cut" buffer of 30 feet on Class I streams and a mere 10 feet on Class II streams would still be required.

There is also no provision for any kind of independent watershed analysis. According to the HCP, the watershed analysis, synthesis, and development of prescriptions is to be carried out by an "interdisciplinary scientific team" composed of "qualified individuals" hired by Pacific Lumber and therefore entirely under company control. The company is only required to "consult" with agency personnel regarding the composition of this team and its responsibilities. Representatives from the National Marine Fisheries Service, California Department of Fish & Game, US Fish & Wildlife Service and Environmental Protection Agency are only allowed to participate to the extent of helping in the development of management prescriptions, not on the team itself.

Any disagreement among these team members concerning final prescriptions, however, triggers the "default" prescriptions described below. However, these defaults are less protective than the "maximum sideboards" described above, and very similar in most respects to the interim prescriptions. In other words, Pacific Lumber will have almost no incentive to agree to final prescriptions stronger than these defaults. Many critics of the plan regard this provision as giving Pacific Lumber a virtual "veto" over proposed more protective measures developed in consultation with wildlife and water quality agencies.

A credible, independent watershed analysis would seek to identify and repair damage caused by past land-use activities, and restore functioning habitat conditions in damaged watersheds before allowing any additional disturbance through timber operations or roadbuilding. Activities posing a high risk to aquatic life such as logging on steep, unstable slopes or where there is a high likelihood of a mass failure into any class of stream (including Class III streams) should be completely avoided. Unfortunately, arbitrary limitations and prior constraints on the outcomes of watershed analysis like those imposed by Pacific Lumber do not allow the flexibility or the sound scientific analysis necessary to develop a credible, effective recovery strategy for aquatic fish and wildlife.

The Default Measures: According to the draft HCP, Pacific Lumber intends to complete watershed analysis for all of its land within the next three years. Should the company simply fail to complete this process, however, or in the event of any disagreements among the team developing prescriptions supposed to arise out of the process, a set of "default" prescriptions would apply instead. These prescriptions are similar in most respects to the "interim" prescriptions described in the HCP, though in some ways are more restrictive. This set of "defaults" is known in the HCP as

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the "January 7" document, after the date on which the strategy was proposed by federal agency negotiators.¹

However, even under these defaults, the Riparian Management Zone (RMZ) width for Class I streams would remain no more than 170 feet, and the Restricted Harvest (no-cut) band would remain a mere 30 feet. However, within the Limited Entry Band (30-100 feet) there would then be a specific requirement to permanently mark and retain seven trees between 36 and 42 inches in diameter, and five trees between 42 and 48 inches in diameter, per acre. There is another requirement to permanently mark and retain 10 trees greater than 40 inches in diameter per acre throughout the Riparian Management Zone, but it is unclear whether this is in addition to or inclusive of the twelve trees retained in the Limited Entry Band. It is also unclear how this "permanent" retention would be applied as a "default" strategy in areas where Pacific Lumber simply has not completed watershed analysis within the three-year time frame.

Significantly, many streamside areas on Pacific Lumber land have been heavily logged, as permitted under the state's current Forest Practice Rules, and no trees this large exist anywhere near the streams. In such cases, only the "ten largest trees per acre" must be retained. Thus the prospect of large woody debris (LWD) recruitment into the stream from the retention of large trees in many Riparian Management Zones (RMZs) may not be realized for several more decades.

As proposed by PALCO, along Class II streams, a Riparian Management Zone (RMZ) of either 100 feet or 130 feet would be established, depending on the watercourse's location in the property. The Humboldt Bay Watershed Assessment Area, which includes Freshwater Creek and the Elk River, would receive a 100-foot buffer, whereas all other Class II watercourses would receive a 130-foot buffer. The Restricted Harvest (no-cut) band proposed in all cases is a mere 30 feet wide. In addition, the Riparian Management Zone (RMZ) for both Class I and II streams could be extended on steep slopes (>50%) to either the break in slope or a point agreed upon by Pacific Lumber and the agencies. Nevertheless, even with these qualification these RMZs are going to be rather narrow and (particularly on steep slopes) simply insufficient to adequately protect riparian areas from mass wasting or landslide events.

The mass wasting avoidance strategy is also slightly different from that applied during the interim. For areas of extreme, very high and high landslide hazard, no logging or road-building would be allowed unless a team composed of a forester, a geologist, and at least one agency representative determines an alternative prescription. If there is a disagreement among the team, a representative of the California Division of Mines and Geology would make the final call. The

¹ This document is known as the "Corrected Version Draft-Interagency Federal-State Aquatic Strategy and Mitigation for Timber Harvest and Roads for the Pacific Lumber Company," dated January 7, 1998.

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default prescriptions also prohibit new road construction during the winter period as well as during all periods of measurable precipitation, and require that the company allow 48 hours without precipitation to elapse before resuming construction.

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While these default provisions are well and good, in many cases they are still far less stringent than what many scientists have stated are necessary to protect, restore or recover endangered salmonids.

V. Buffer Zone RMZ Design Allows Too Much Disturbance and Fails to Prevent Blowdowns: One of the most-discussed components of the HCP is the creation of Riparian Management Zone (RMZ) "buffers" along streams and rivers. These narrow buffer zones should be designed to provide shade, preserve the moist forest microclimate that keeps streams cool, allow for species migration corridors and allow large trees to naturally fall into and across streams as "large woody debris (LWD)." According to FEMAT, the width of buffer zones should be biologically based, with widths the same as the potential height of the trees that will grow at a specific site. These "site-potential" widths thus vary with tree species, rainfall and soil productivity, with the most important riparian areas provided the greater protection.

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Under the FEMAT-type model, year-round fish-bearing streams (Class I streams) are provided buffers at least as wide as the potential height of the trees on the stream banks.² In the redwood region, a single site potential tree width would be roughly 300 feet, although redwoods can grow taller. Under FEMAT, year-round streams that do not support fish (equivalent to Class II streams) and the steep, seasonal streams in the upper portions of coastal watersheds (Class III streams) should also be protected by buffers based on site potential tree height, although they are narrower than those on Class I streams. FEMAT also prohibits commercial logging operations within these buffer areas until and unless indicated through a watershed analysis process. The important feature of these buffer zones is that they were biologically based, i.e., based on the site potential tree height, rather than strictly numerical.

Pacific Lumber's HCP, however, proposes entirely numerical (as opposed to biologically based) interim buffer zones for Class I and Class II streams, and only somewhat limits heavy equipment operations near Class III streams, but even then only for three years pending completion of a rather inadequate "watershed analysis" process designed to create more site-specific prescriptions (see above).

In the HCP/SYP as proposed, Class I streams would be afforded only a 170-foot interim

² FEMAT itself provides for Class I (fish-bearing perennial) streams to have a buffer zone the width of two site potential trees (spt), rather than one. The standard we are proposing here is only half of that.

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buffer RMZ broken into three "bands": a Restricted Harvest Band (0-30 feet from the streambank); a Limited Entry Band (30-100 feet); and an Outer Band (100-170 feet). Class II streams also would receive only a 100-foot Riparian Management Zone, divided into a 10-foot Restricted Harvest Band and a 90-foot Outer Band. These buffer zones are far narrower than those recommended by the FEMAT team as well as those considered necessary for salmon protection and restoration by many scientists. Furthermore, fairly extensive logging would still be allowed in most of these so-called "buffer" RMZs, thus exacerbating soil disturbances.

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Furthermore, there are no buffer RMZs whatsoever proposed for Class III streams, even though those streams are the most likely to be in the steepest and most erosion-prone geological areas, and an obvious major sediment delivery route to downslope Class I's and Class II's. In fact, there are virtually no logging restrictions at all along the steep, seasonal Class III streams that could contribute huge amounts of sediment to larger streams from contemplated widespread upslope logging activities. Instead, a process very similar to the one provided by California's Forest Practice Rules restricts heavy equipment use near these streams, but allows significant loopholes for specific logging plans. Retention of mature forests on these steep, erodible watercourses is essential to ensure water quality, maintain bank stability and prevent sediment from reaching fish-bearing stream reaches lower down. Protection for these water-source streams is also essential to maintain downstream water temperatures within the range that coho salmon and other salmonids need for their survival. Thus Class III riparian areas should also have RMZ buffer zones (albeit narrower ones than for Class I and II) as well as clearer equipment exclusion rules and other mandatory measures designed to minimize soil disturbance or downstream transport of sediment, and that will maintain relatively low temperatures for inflowing waters that will feed Class II and Class I streams directly downhill.

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RMZ buffer zones should in every case be: (1) biologically based on the height of a mature site potential redwood tree; (2) measured horizontally, rather than by slope measure, so that they adjust automatically for steeper slopes where they are most needed to prevent mass failure landslides.

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The HCP discussion in Part D, Section 1 (Aquatic Species Conservation Plan) on RMZ buffer size is not persuasive that small buffers will fully protect aquatic functions. First, the wide variation in state forest practices act RMZs is because in each case such RMZs were set as political compromises, not that they were based on any kind of biological criteria or scientific input. Secondly, although such factors as shade, recruitment of large woody debris and bank stability can be mostly satisfied within a relatively narrow band, other biologically important factors including maintenance of microclimates, relative humidity, wide migration and shelter corridors for amphibians and other riparian dependent species, and other factors simply cannot be fully met in buffer zones less than at least one site potential tree height wide. Likewise the

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connectivity between riparian and upslope impacts cannot be minimized -- whatever disturbance happens upslope will inevitably impact the stream below it because (simply put) mud flows downhill. The wider the RMZ, the better defended the stream system is from upland impacts and landslides, and the better able the riparian area will be to function normally.

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Furthermore, a relatively narrow RMZ will rapidly decay over time through blowdown and 'edge effects' unless there is a substantial outer zone of trees to prevent this disruption. By focussing solely on temperature, shading and LWD recruitment, PALCO is simply ignoring the other factors which are inconvenient to their presumption that RMZ's of 170 ft. or less will adequately protection riparian functions and resources.

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Throughout the Riparian Management Zones, the use of herbicides or pesticides should be prohibited. "Emergency exemption" and salvage operations should be allowed only with the permission of wildlife agencies. Trees felled during logging operations within the RMZ should only be removed using "full suspension" highline systems which prevent trees from scarring the ground and increasing erosion. The HCP now only specifies that these guidelines would be implemented "where feasible." These standards should be made binding as a condition for issuing any ITP, subject only to exemption by approval of the NMFS, USFWS and Cal. Dept. of Fish and Game.

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The HCP also states that roads will not be constructed in Riparian Management Zones, but provides exceptions for watercourse crossings and areas where "feasible alternatives that would have less environmental impact are clearly not available." We recommend that some criteria for allowance of such an exception be developed, and that in any case all RMZ crossings be either temporary crossings, or that if permanent that a bridge system be installed to prevent entrapment of large woody debris and passage problems for salmonids and other fish species.

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Finally, in the Class I Riparian Management Zones, the "ten largest trees per acre" must be retained so that they may one day naturally fall into the stream channel. There is no provision, however, for permanently marking or retaining these trees. With re-entry allowed every 20 years, in fact it is highly likely that the largest trees will periodically be removed under this plan, and never reach the stream channel at all.

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Logging is proposed within the Restricted Harvest Bands only where it will "enhance and facilitate riparian functions based upon a completed Watershed Analysis, and Riparian Management Plan as agreed upon by the permitting agencies." Although this Restricted Harvest Band has been popularly called a "no-cut" zone, it is, in fact, open to various limited types of logging through this means. Additional biologically based criteria for logging in these zones needs to be specific in the HCP/SYP.

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The Class I Limited Entry Band allows logging operations once every 20 years. A "Late Seral Selection" prescription is proposed according to the "basal area" (the area occupied by cross-sections of standing trees at breast height) of the forest. For example, a young tree 24 inches in diameter at breast height contributes just over 3 square feet of basal area, whereas a huge ancient tree 10 feet across contributes over 78 square feet to the total. Under this prescription, logging will still be allowed in areas where basal area of at least 345 square feet per acre already exists within the Limited Entry Band, a minimum of 300 square feet per acre can remain after logging, and no more than 40% of the conifer basal area is removed in any one logging operation or entry.

However, as proposed the Class I and II Outer Bands could be logged in a similar fashion, once every 20 years. In the outer bands, however, logging would be allowed in areas where basal area of 276 square feet per acre already exists within the Outer Band. After logging, only 240 square feet per acre need remain, though no more than 40% of conifer basal area could be removed in any one logging operation.

For several reasons, it is unclear that the Riparian Management Zones will actually contribute to the creation of "properly functioning" stream habitat under these logging prescriptions. For one thing, if 40% of the conifer basal area can be removed in each entry, and entry is allowed each 20 years, it is unclear whether basal area minimum retention standards would assure a healthy forest condition with a wide enough spread of age and size classes. Each of the logging prescriptions for the riparian zones features a table showing how many trees per acre will be retained in various size classes, giving the impression that logging in these zones will produce a well-distributed, uneven-aged forest. However, a disclaimer beneath the tables clarifies that this distribution is "provided for information purposes only," and that basal area requirements are the guiding factor in implementing the prescriptions.

Although ten trees greater than 40 inches in diameter (or the ten largest trees available per acre of riparian zone) are supposedly to be retained, nowhere is it clear that this retention is permanent; these trees apparently could be cut and "replaced" with smaller trees over time. Furthermore, neither riparian logging prescription requires retention of any trees larger than 48" in diameter in the Limited Entry Band and 40" in diameter in the Outer Bands. This seems to indicate that larger trees will rather automatically be logged off well before they can grow old enough to fall into the streams on their own. Such a practice seems to contradict one of the key reasons for retaining mature forest along streams: recruitment of the "large woody debris" so essential to salmon habitat. The end result, over time, would likely be to impoverish many stream systems of the LWD they need to support healthy populations of coho and other salmonids.

Finally, even these incomplete and inadequate measures are only interim approaches, in place

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only for the next three years, and subject to revision by the watershed analysis process whose inadequacies were described above.

We believe that aquatic resource protections require that minimum RMZ widths should be increased to at least the height of one site-potential tree (spt) (about. 300 ft. for mature redwoods but varying by site potential) for Class I streams, 0.75 spt for Class II (approx. 225 ft.) and no less than 75 ft. on each side of the stream channel for Class III's. We also recommend that there be NO HARVEST allowed anywhere within these RMZ's. The only exceptions to this rule should be for thinning and other operations whose sole purpose is to help restore damaged ecological functions in and around riparian areas, such as hardwood conversions intended to replace hardwood dominated stands with conifers, and then only where it will "enhance and facilitate riparian functions based upon a completed Watershed Analysis, and Riparian Management Plan as agreed upon by the permitting agencies."

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We also recommend that basal area minimum standards be made binding and permanent. If PALCO relies on retaining the "ten largest trees per acre" then those trees should be permanently marked and permanently retained, not simply taken in a later entry.

VI. Comments on "Guidelines for Forest Roads and Landings," (Vol. II, Part N) of the Pacific Lumber Company's SYP/HCP: These road and landing construction guidelines are simply insufficient to prevent major sediment deliveries to riparian areas.

Salmonids require gravels that have low concentrations of fine sediments and organic material for successful spawning and incubation. Bedload or suspended organic and inorganic materials that settle out over spawning redds affect the intragravel environment of salmonid embryos in several ways. Inorganic sediments may clog substrate interstices and fine sediments may act as a physical barrier to fry emergence. Eggs deposited in small gravel or in gravel with a high percentage of fine sediments have a much lower survival to emergence.

The guidelines for forest roads and landings (part N) described in the PALCO SYP/HCP do not assure the protection or future existence on these lands of the coho salmon, a threatened species under the Endangered Species Act, and would therefore "appreciably reduce the likelihood of the survival and recovery of the species in the wild," nor do these measures minimize and mitigate the impacts of the taking "to the maximum extent practicable." Both of these standards must be met if PALCO is to receive an Incidental Take Permit under the ESA (16 U.S.C §1539(a)(B)(ii) & (iv)) in the form of an HCP.

PALCO lands contain the last, best refuge and spawning areas for this species in this state. Protection of these refuge areas is crucial to any future recovery effort. Roads can produce 50%

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to 80% of sediment input into streams (Hagans et al., 1986). Failure of roads during major storm events as well as chronic surface and gully erosion are two major sources of sediment that can greatly increase stream system sediment loads and destroy salmonid spawning habitat. Also, roads can affect coho salmon by altering channel morphology and destabilizing streambanks, modifying the hydrologic drainage network, creating barriers to movement, and increasing potential for chemical contamination (Furniss et al., 1991).

In addition, many streams within PALCO lands are now too hot for coho and other salmonids (See temperature profile charts included as part of ATTACHMENT 3). In many cases this is also due to massive sediment input which overwhelms deep pools, increases water opacity, increases stream velocity (undercutting banks and maintaining more suspended sediment), broadens the flood plain and increases overall exposure to solar energy. These increased sediment loads are themselves either largely due to or greatly exacerbated by upslope logging and roadbuilding operations that change the hillside hydrology, decrease soil stability and increase the frequency of landslides and road washouts.

Salmonids require specific temperature ranges for spawning and rearing success. Coho salmon, for instance, prefer water temperatures of about 12-14° C. Temperatures over 14° C. Become increasingly stressful, and temperatures are high at 25° C. are quickly lethal (See Spence, 1996, esp. pp. 94 -104). However, the PALCO HCP proposes stream temperature standards that are several degrees above the optimum range for coho salmon. Many streams within PALCO ownership are, in fact, so sedimented that extreme temperatures have become a serious problem.

1. Sediment and Coho Salmon:

Coho salmon, as well as steelhead and coastal cutthroat trout, are very vulnerable to sediment pollution because they build their nests (called "redds") in the stream bottom gravel beds. The eggs, buried one to three feet deep in the gravel, rely on a steady flow of clean, cold water to bring oxygen and remove waste products (Derksen, 1998). Since the redd is a depression in the streambed, it creates a Venturi effect, drawing water down into the gravel (Derksen, 1997). If great amounts of fine sediment exist in the stream, it will be sucked down into the redd and overwhelm it. After approximately 30 days, the eggs hatch into alevin and remain in the gravel for about another 30 days, relying on a yolk sac for nourishment. When the alevin develop into fry, the yolk sac diminishes and the fry must leave the gravel and take up life in the stream. If fine sediment clogs interstitial spaces between streambed gravel, juvenile salmonids lose both their source of cover and food (Derksen, 1998). During the 60-day period when the eggs and alevin are in the gravel, any shifts of the stream bottom can kill them.

High amounts of suspended sediment in the winter can also adversely impact the feeding

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ability of juvenile coho salmon, steelhead, or cutthroat trout. Too much suspended sediment in the stream greatly reduces vision and this can prohibit salmonids from finding food. Also, during the year they spend in the stream, coho salmon prefer deep pools that form around large pieces of wood (Derksen, 1998). Sediment eroded from roads can fill these pools and cause reduction or loss of essential coho rearing habitat. High bedload transport can bury low gradient reaches of streams in tons of sediment. When streams are impacted by high sediment transport, formerly productive reaches of stream with good gravel and large wood can become wide and shallow, inhibiting the recovery of fish habitat for decades (Frissell, 1992).

2. Road Densities and Sediment Levels in Streams on PALCO land:

The Clean Water Act, passed by Congress in 1972, protects drinking water and other beneficial uses, like recreation and fisheries resources. In northern California, beneficial uses include production of cold water fishes such as salmon, steelhead, and coastal cutthroat trout. The U. S. Environmental Protection Agency (EPA) and the California State Water Resources Control Board (SWRCB) recently have focused on controlling pollution from non-point sources such as agricultural runoff or erosion from roads and timber operations.

One mechanism to address both point and non-point source pollution on a watershed basis is the Total Maximum Daily Load (TMDL). A TMDL is a quantitative assessment of pollution sources and allocations of effort to reduce pollution levels. In accordance with Section 303(d) of the Clean Water Act, TMDLs are required for water bodies listed as impaired or threatened. Elevated levels of sediment and temperature adversely impact spawning and rearing habitat for fish and are considered the principle causes of impairment for most north coast water bodies (Derksen, 1998).

The maximum biologically warranted thresholds for levels of fine sediment in streams on PALCO lands can be established from the U.S. Environmental Protection Agency's Garcia River TMDL study (1997). The Garcia River TMDL set a standard of 14% for fines less than 0.85 mm and 30% for fines less than 6.4 mm. The EPA will be setting standards in other northern California areas as part of its TMDL program and targets for the PALCO area may vary somewhat depending on local geology but would likely be comparable to those set in the Garcia. These standards also have considerable biological support in the literature. Excessive fines (>13% of sediments <0.85 mm) result in increased intragravel mortality for coho salmon and steelhead embryos because of oxygen stress. Organic materials that enter the substrate interstices also use up oxygen as they decompose, further reducing dissolved oxygen necessary for fish survival. Salmon and trout avoid areas with high percentages of sand, silt and clay (Spence, B. C., et al., 1996, pg. 98).

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Nevertheless, in an effort to downplay the problem PALCO has chosen to sample only for fines less than 4.7 mm, which greatly underestimates the problems with sand-sized particles. Other independent studies show that there are serious sedimentation problems on PALCO lands. In Freshwater Creek, for instance, sediment levels reached as high as 48% for sediment <0.85 mm and 66% for sediment <4.7 mm. These levels are fatal to emerging salmon alevins.

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A connection clearly exists between road densities on PALCO land and levels of fine sediment in adjacent streams (Derksen, 1998). Watersheds with greater road densities are found to have higher levels of fine sediment in their streams. C. J. Cedarholm (1981) of Washington State University found that watersheds with more than 3.0 miles of roads per square mile of land area had significant increases in fine sediment in salmon spawning gravels. Currently, on PALCO land, there exists on average 4.6 miles of road per square mile of land. In the Freshwater Creek basin, as many as 7.9 miles of road per square mile of land exist. Also, PALCO does not count logging spur roads or tractor trails in its road count, though they are often major erosion sources. Thus its road mile density figures are probably understating the problems its past management has created for many salmon-bearing riparian streams.

See **CHART 1** for an overview of sediment levels in PALCO streams. Values in bold indicate sediment levels higher than the recommended TMDL threshold levels. These values are taken from various agency and official governmental sources as collected in the KRIS-Coho GIS-based data system, which is now available on CD ROM. A copy of the KRIS-Coho CD is enclosed with these comments and incorporated herein by reference as ATTACHMENT I. This CD should be considered an integral part of our public comments. All data sources are referenced therein.

3. Excessive Road Density Proposed in the Plan:

Though the road density on the vast majority of PALCO land already exceeds the EPA recommended road density for preventing excessive sediment erosion into salmon-bearing streams, under its proposed operations plan PALCO has plans to continue building new roads at a rate much faster than they plan to decommission old roads. Currently, approximately 4.6 miles of road per square mile cover PALCO land on average. This is over 50% more roads than the EPA recommended 3.0 miles of road per square mile for safeguarding salmon habitat from sediment infiltration. PALCO's own inventory states that it has 1568.5 miles of logging road. Nevertheless, PALCO proposes in its HCP/SYP to expand that road network by at least another 146.1 miles (See HCP Map 8), again not counting spur roads and skid trails, which would add considerably to the road inventory.

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In the draft PALCO SYP/HCP, methods of road construction and reconstruction are

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discussed at length while little mention is given to decommissioning problematic roads that are contributing sediment to streams. Many of these old road are sediment 'time bombs' just waiting to fail in the next major storm even. The SYP/HCP reads, "PALCO views road reconstruction as an opportunity to improve watershed conditions and reduce long-term erosion while providing access to a previously harvested or managed area" (Vol. II, Part N, p.6). This is only true to a certain degree. Reconstructing and building more roads, however, has little to do with watershed improvement when, in fact, it is the excessive road density itself that contributes the majority of sediment eroded into streams (Hagans et al., 1986). Instead, PALCO should be permanently decommissioning the majority of its old road network as well as reconstructing and upgrading necessary roads to newer standards, including to 100 flood event culvert standards.

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4. Road Construction and Design:

Before any new roads are constructed or reconstructed, roads and landings along streamsides or which drain into streamsides should be decommissioned. In addition, PALCO should immediately inventory in its road count, decommission and plant over logging spur roads or tractor trails in priority of their likelihood for erosive failure.

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With only 1% of its original population intact, the coho salmon cannot tolerate any more sediment pollution in their last, best refuge areas. Though PALCO states they will "avoid" building roads in such areas as watercourse and lake protection zones, steep slopes, inner gorges, unstable soils, and areas of sensitive wildlife habitat, they do not guarantee they will not build roads in these critical areas (PALCO SYP/HCP, Vol. II, Part N, p. 6). The National Marine Fisheries Service (1997) recommends that no new roads, opening of closed roads or new stream crossings should take place in Aquatic Protection Zones or Aquatic Management Zones. The risk of catastrophic erosion in such places as inner gorges and unstable soils is too high to be tolerated in any instance. No new roads should be built where such high risks occur. Where necessary, alternative logging methods that do not require extensive road systems (e.g., helicopter logging) should be used instead. In the long run -- given long term road maintenance problems and the high risk of potential blowouts -- helicopter logging is probably more cost effective, particularly on unstable and highly erosive steep sites, than constructing and maintaining an extensive roadbed network.

The National Marine Fisheries Service also issued the Draft Coho Salmon Take Avoidance Guidelines for Forestry Activities in California (1997) with recommendations on how to construct, maintain, and use roads. The PALCO HCP/SYP falls short of meeting many of these guidelines. Among other issues relevant here, the NMFS guidelines prohibit the construction of roads and landings on unstable areas, steep slopes (>50%) with no benches, in headwalls of defined channels, or on narrow ridges between defined channels, unless using full

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bench construction methods limiting the amount of fill (based on studies by Weaver and Hagans (1994)). The PALCO HCP/SYP suggests using full bench construction on roads only over 60% slope and certainly does not guarantee no building of roads on unstable slopes (Vol. II, Part N, p. 7).

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Culverts are frequent sources of a road failures. When culverts get plugged in large storm events, water backs up behind them and can take out an entire road (Derksen, 1998). The NMFS guidelines also recommend that existing culverts should be inventoried and, if necessary, reconstructed to meet or exceed 100 year flood hydraulic criteria or debris capacity. Given that these lands are among the most geologically unstable in the area, are generally steep and in a high rainfall region and are therefore very prone to mass failures, these standards would seem to be reasonable precautions. The PALCO HCP/SYP, however, does not assure that culverts will meet such standards; instead they intend to design culverts for only a 50-year flood (Vol. II, Part N, p. 16). All culverts should be installed to 100-year flood event criteria, especially given the high likelihood of major storm events in the future.

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Changes in hydrology due to road-related extension of the channel network are a serious concern and should also be avoided. NMFS states that roads and runoff ditches should be reconstructed such that runoff is not intercepted and concentrated into streams or onto hillslopes. We recommend that road runoff systems and culverts be hydrologically disconnected from the stream system whenever possible. This, incidentally, is consistent with NMFS recommendations for changes in Oregon's Forest Practices Act in its report "Draft Proposal on Oregon Forest Practices Act" dated February 17, 1998, presented to the Oregon Board of Forestry. The hydrology of the two regions is virtually identical. Among NMFS's suggestions there that should be incorporated into the PALCO HCP/SYP are the following:

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"Keep road drainage from disrupting the natural routes of hillslope ground and surface waters. In a harvest area (including the haul route), existing roads and runoff ditches should be constructed so that runoff is not intercepted and concentrated into streams or onto high risk sites (e.g., road fills, convergent slopes, bedrock hollows, or inner gorges).

In considering problems of fish passage that are created by culverts, the same report recommended that existing culverts and other stream crossings be inventoried and, if necessary reconstructed to accomplish the following:

"Provide passage for both juveniles and adults in current historic anadromous fish streams so that historical distribution patterns are restored. Stream crossings should meet NMFS's fish passage criteria."

Mr. Bruce Halstead/ John Munn
RE: PALCO HCP/SYP Comments

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The Culvert Passage Guidelines referred to were developed by NMFS Environmental and Technical Services Division, Portland, OR dated March 1, 1996. They are enclosed as ATTACHMENT 2 and incorporated into these comments by reference. We recommend that NMFS and USFWS require these standards in the PALCO HCP/SYP documents.

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5. Road Use:

According to the NMFS guidelines for coho salmon take avoidance (1997), no hauling or skidding should occur in wet weather conditions (0.25 in. precipitation in 48 hours), especially during the winter period (October 1 – May 31) and after rainfall events all year. Hauling or skidding should not resume for 48 hours after precipitation ends or until road surfaces and ditches are not flowing with water. During wet weather, roads are particularly susceptible to erosion, especially if driven upon. Most of the lands covered by the HCP/SYP are also highly erodible and steep sloped. The PALCO HCP does not restrict hauling and skidding to appropriately dry weather.

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The HCP also does not address the transport of chemicals (herbicides, pesticides, rodenticides, fire retardant, dust abatement, oil and fuel, etc.) on logging roads. When chemicals are transported across or adjacent to streams, a chemical-spill hazard exists (Furniss et al. 1991). If a chemical spill were to occur on a road, the chemicals could drain into the creek and potentially harm or kill fish. These chemicals can harm salmonids by their direct toxicity or by altering primary and secondary production and affecting the amount and type of food available (Norris et al. 1991). Plans to clean up an accidental chemical spill should be in place before chemicals are transported on logging roads.

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6. Alternatives to Roads:

One alternative to opening existing roads or constructing new roads is implementing a longer yarding capacity system (NMFS, 1997). This would lessen the impact of sediment erosion on salmon bearing streams by eliminating the need for skid roads and major soil disturbance by tractors.

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Another method of transporting logs is through helicopters. The economic and environmental benefits of helicopter logging should be explored as an alternative to road use. Given the high construction and long-term maintenance costs of roads (including costs of decommissioning), the high probability of mass failures and erosion, and given the high value of most of the timber harvested, it may in fact be more cost effective in the long run to yard and haul logs via a mix of long-line suspension systems and helicopter systems than under any other logging system.

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VII. Landslide Risk Assessment and Road Erosion Mitigation Efforts are Insufficient to Prevent Mass Failures: The PALCO ownership contains many of the steepest and least geologically stable areas in the State of California, all of which are subject to heavy rainfalls. PALCO is essentially proposing a "trust us" protocol whereby a PALCO employee of unspecified training will visually inventory and assign risk factors to any number of steep slope areas with unstable soil.

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A far better, more trustworthy and more scientifically legitimate approach would be to use outside contractors applying some of the newly emerging objective risk assessment criteria such as those being developed by Drs. Dietrich and Montgomery (both of UC Berkeley). They have developed a highly objective and easily usable risk assessment methodology based on satellite reconnaissance and identifiable geomorphological features or measurable factors such as root shear strength and soil moisture.

We therefore recommend that all inventory and risk assessment of sites where mass failure or other landslide events may take place should be done using more modern assessment protocols by an outside contracting firm, not in-house as proposed. Protocols should include objective assessment models such as those being developed by Dietrich and Montgomery (see Bibliography).

VIII. Given its Duration, Specific Performance Standards Should Be Built in to the HCP: Many watersheds on PALCO lands have been severely damaged and will take some time to recover. Specific performance standards for riparian criteria such as sediment budgets, water temperature and other factors need to become part of the HCP and ITP as conditions for its continuance. In particular, specific coho and other salmonid restoration performance standards or "benchmarks" need to be adopted as part of the deal. If PALCO seeks regulatory certainty for its operations, then commercial and recreational fishermen and the general public have a right to corresponding certainties that there will be effective recovery from severely damaged watershed conditions and that aquatic species faced with extinction will not suffer further declines as a result of PALCO actions.

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At a minimum, TMDL standards should be adopted for fish-bearing streams on PALCO lands. This involves setting reasonable and biologically based maximum "thresholds" or triggers for: percent fines in river systems; dissolved oxygen levels; temperature standards, many of which are outside salmon tolerance levels. Other 'triggers' should be adopted in terms of percentage and type of large woody debris (LWD); pool to riffle ratios; sediment loads already present; potential risk of landslides. Where these 'triggers' are exceeded, timber harvest operations and road building should simply cease until these parameters are once again within normal ranges. An additional performance standard is the restoration of fish populations themselves. Certain target

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numbers of wild spawning salmon and minimum escapements should be adopted as well as performance standards by which to measure success of watershed restoration efforts.

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The reality is that the majority of streams on PALCO lands are severely water quality limited to the point where they no longer support fish populations they historically supported. Where streams are already water quality limited during part of the day as a result of water temperatures exceeding optimal spawning and incubation ranges for coho salmon (~10° C.); dissolved O₂ levels less than 8.0 mg/L; fine sediment <0.85 mm more than 13%, and other water quality ranges for coho salmon, there should be NO ADDITIONAL TIMBER OPERATIONS OR ROADBUILDING IN THOSE WATERSHED until water quality parameters have been restored to biologically optimal ranges. These standards will be "interim standards" until such time as the EPA can develop and adopt alternative TMDL's and water quality standards that will then be incorporated into the HCP.

SUMMARY OF MAJOR RECOMMENDATIONS

(1) RMZ stream buffer zones should be: (1) biologically based; (2) measured horizontally, rather than by slope measure, so that they adjust automatically for steeper slopes where they are most needed to prevent mass failure landslides. Minimum RMZ widths should be increased to at least the height of one site-potential tree (spt) (approx. 300 ft. but varying by site potential) for Class I streams, 0.75 spt for Class II (225 ft.) and no less than 75 ft for Class III's. We also recommend that there be NO HARVEST allowed anywhere within these RMZ's. The only exceptions to this rule should be for thinning and other operations whose sole purpose is to help restore damage ecological functions in and around riparian areas, such as hardwood conversions intended to replace hardwood dominated stands with conifers, and then only where it will "enhance and facilitate riparian functions based upon a completed Watershed Analysis, and Riparian Management Plan as agreed upon by the permitting agencies."

(2) RMZ buffer zones should in every instance be: (1) biologically based on site potential tree height of redwoods; (2) measured horizontally, rather than by slope measure, so that they adjust automatically for steeper slopes where they are most needed to prevent mass failure landslides. Class III riparian areas should also have clearer equipment exclusion rules and other mandatory measures designed to minimize soil disturbance, the downstream transport of sediment and that will maintain relatively low temperatures for inflowing waters that will feed Class II and Class I streams directly downhill.

(3) Watershed analysis should be conducted by entities independent of PALCO, using protocols and criteria directly established by NMFS and USFWS. A credible, independent

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watershed analysis would seek to identify and repair damage caused by past land-use activities, and restore functioning habitat conditions in damaged watersheds before allowing any additional disturbance through timber operations or roadbuilding. Activities posing a high risk to aquatic life such as logging on steep, unstable slopes or where there is a high likelihood of a mass failure into any class of stream (including Class III streams) should be completely avoided.

(4) There should be no maximum RMZ sidebars. If watershed analysis indicates serious watershed problems, then RMZ appropriate to long-term solutions should be demarcated on the map in whatever size is warranted by independent watershed analysis.

(5) Inventory and risk assessment of sites where mass failure or other landslide events may take place should be done using more modern assessment protocols by an outside contracting firm, not in-house as proposed. Protocols should include objective assessment models such as those being developed by Dietrich and Montgomery (see Bibliography).

(6) Roads should be hydrologically disconnected from streams to minimize erosion inflow and fines. While the road erosion reduction measures proposed are good so far as they go, PALCO should be permanently decommissioning more of its old road network as well as reconstructing and upgrading all necessary roads to newer standards, including culvert upgrades to 100 year flood event standards. Before any new roads are constructed, existing roads and landings along streamsides or which drain into streamsides should be decommissioned. In addition, PALCO should immediately inventory in its road count, decommission and plant over logging spur roads or tractor trails in priority of their likelihood for erosive failure.

(7) All RMZ road crossings be either temporary crossings, or that if permanent a bridge system be installed to prevent entrapment of large woody debris and passage problems for salmonids and other fish species. PALCO should be prohibited from construction of roads and landings on unstable areas, steep slopes (>50%) with no benches, in headwalls of defined channels, or on narrow ridges between defined channels, unless using full bench construction methods limiting the amount of fill (based on studies and guidelines by Weaver and Hagans (1994)).

(8) No hauling or skidding should occur in wet weather conditions (0.25 in. precipitation in 48 hours), especially during the winter period (October 1 – May 31) and after rainfall events all year. Hauling or skidding should not resume for 48 hours after precipitation ends or until road surfaces and ditches are not flowing with water.

(9) Basal area minimum retention standards be made binding and permanent, not just advisory as currently presented. If PALCO is going to rely on retaining the "ten largest trees per acre"

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there must be provision for permanently marking or retaining these trees so that they do not fall to future entry.

(10) Throughout the Riparian Management Zones, the use of herbicides or pesticides should be prohibited. "Emergency exemption" and salvage operations should be allowed only with the permission of wildlife agencies. Trees felled during logging operations within the RMZ should only be removed using "full suspension" highline systems which prevent trees from scarring the ground and increasing erosion. The HCP now only specifies that these guidelines would be implemented "where feasible." These standards should be made binding as a condition for issuing any ITP, subject only to exemption by approval of the NMFS, USFWS and Cal. Dept. of Fish and Game.

(11) Where streams are already water quality limited during part of the day as a result of water temperatures exceeding optimal spawning and incubation ranges for coho salmon ($\sim 10^{\circ}\text{C}$.); dissolved O_2 levels less than 8.0 mg/L; fine sediment < 0.85 mm more than 13%, and other water quality ranges for coho salmon, there should be NO ADDITIONAL TIMBER OPERATIONS OR ROADBUILDING IN THOSE WATERSHED until water quality parameters have been restored to biologically optimal ranges. These standards will be "interim standards" until such time as the EPA can develop and adopt alternative TMDL's and water quality standards that will then be incorporated into the HCP.

(12) Biologically based maximum "thresholds" or triggers should be specified as performance standards for: percent fines in river systems; dissolved oxygen levels; temperature standards; and adult salmonid escapements and spawning success. Other similar 'triggers' and performance standards should be adopted in terms of percentage and type of large woody debris (LWD); pool to riffle ratios; sediment loads already present; potential risk of landslides. Where these 'triggers' are exceeded, timber harvest operations and road building should simply cease until these parameters are once again within normal ranges. Where specific performance standards have been and continue to be met, some restrictions on PALCO operations could then be loosened.

(13) Provide passage for both juveniles and adults in current historic anadromous fish streams so that historical distribution patterns are restored. Stream crossings should meet NMFS's fish passage criteria as set forth in "The Culvert Passage Guidelines" developed by NMFS Environmental and Technical Services Division, Portland, OR dated March 1, 1996 (see ATTACHMENT 2) or other similar guidance documents.

(14) Helicopter logging should be the preferred method in steep sloped, highly unstable areas. The economic and environmental benefits of helicopter logging should be explored as an alternative to road construction. Given the high construction and long-term maintenance costs of

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roads (including costs of decommissioning), the high probability of mass failures and erosion, and given the high value of most of the timber harvested, it may in fact be more cost effective in the long run to yard and haul logs via a mix of long-line suspension systems and helicopter systems than under any other logging system.

This concludes our supplemental comments. In conclusion, we believe that there is a real opportunity for PALCO to develop an HCP that would provide meaningful protection for the forest ecosystem under its care, and that would also contribute meaningfully toward the protection and recovery of coho salmon, chinook salmon, steelhead, cutthroat and the many other aquatic species that are either seriously depressed or facing extinction throughout its land base as a direct result of its past practices. However, as written this HCP is seriously deficient, and simply will not meet the standards of Section 10(a)(B)(ii) & (iv) of the ESA (16 U.S.C §1539(a)(B)(ii) & (iv)) which requires that no HCP can be approved without a showing by the applicant and a finding by the Secretary that:

“(ii) the applicant will, to the maximum extent practicable, minimize and mitigate the impacts of such taking;

.....

(iv) the taking will not appreciably reduce the likelihood of the survival and recovery of the species in the wild.”

On careful review, it is clear that the information upon which the HCP is based is seriously faulty, and that the measures proposed in the HCP neither minimize or mitigate the impacts of PALCO's proposed continued taking of ESA listed species to the extent feasible. Likewise these measures, if implemented, would appreciably reduce the likelihood of both the survival and the ultimate recovery of these species in the wild, and might in fact contribute significantly to the ultimate extinction of at least coho salmon in Northern California, and possibly other species as well.

There are likely to be some changes in the HCP in order to comply with the incentives of newly adopted AB 1986. We are not unmindful of the provisions of that bill, signed 19 September, 1998. However, to date the HCP has not been formally modified in accordance with those provisions (which include a 100 ft. 'no cut' riparian buffer zone and the adoption of the January 7, 1998 aquatic strategy document). Thus our comments are specific to the HCP as currently proposed. Some of those provisions, if adopted by PALCO, are in accordance with or would move toward the standards and suggestions we have made -- some would not. Where a provision of AB 1986 would fully resolve a concern or implement a suggestion in our comments, we would obviously support it.

Mr. Bruce Halstead/ John Munn
RE: PALCO HCP/SYP Comments

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The HCP can be a useful tool for protecting habitat, if properly done and if scientifically valid. We would sincerely like to see PALCO develop a meaningful HCP that would meet the needs for both protection and ultimate recovery of coho salmon as well as prevent likely future listings of several other aquatic and terrestrial species. However, this HCP simply does not meet that standard unless substantially modified as indicated above.

An Incidental Take Permit should therefore be denied at this time.

GHS/lt

Sincerely,

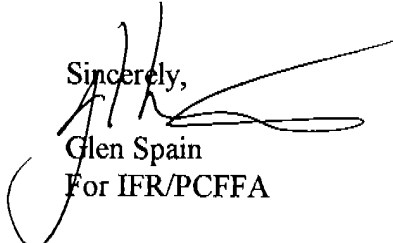

Glen Spain
For IFR/PCFFA

Chart 1 -- Summary of PALCO Road Densities/Sediment Loads by stream.

Attachment 1 -- KRIS-Coho CD ROM GIS-based Information System (1 original CD copy).

Attachment 2 -- Culvert Passage Guidelines developed by NMFS Environmental and Technical Services Division, Portland, OR dated March 1, 1996.

Attachment 3 -- Selected charts and graphs showing road densities, sediment loads and elevated temperatures in selected fish-bearing streams within PALCO HCP planning area.

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Chart 1-- Summary of PALCO Road Densities/Sediment Loads

Basin	Monitoring Station	Miles of Road per Square Mile of Land	Per Cent Sediment < 0.85 mm	Per Cent Sediment < 4.7 mm
Freshwater Cr.	Freshwater 2	3.2	18.4	30.4
Freshwater Cr.	Freshwater 3	3.1	15.2	26.9
Freshwater Cr.	Freshwater 4	2.7	19.0	30.4
Freshwater Cr.	Freshwater 5	2.7	22.8	41.5
Freshwater Cr.	Freshwater 6	5.3	24.2	47.4
Freshwater Cr.	Graham 1	7.9	25.6	43.1
Freshwater Cr.	Graham 2	7.6	24.5	43.9
Freshwater Cr.	L Fresh 1	5.5	39.4	53.5
Freshwater Cr.	McCready	4.6	48.1	66.8
Freshwater Cr.	SF Fresh 1	3.9	26.0	48.0
Freshwater Cr.	SF Fresh 2	3.9	23.2	38.1
Salmon Creek	LowSalmon	3.7	33.3	43.95
Salmon Creek	MidSalmon	2.3	22.05	38.95
Salmon Creek	UpSalmon	4.2	44.55	58.1

Mattole River	RattleSnake	1.9	12.0	28.3
Mattole River	Alwardt 1	2.9	17.3	34.6
Mattole River	Bear Riv 1	3.0	13.8	26.6
Mattole River	Oil F & G	3.4	20.7	40.4
Mattole River	Green Ridge	3.9	23.6	49.4
Eel River	Bear Cr. 2	4.0	17.3	36.9
Eel River	Bear Cr. 3	4.1	14.3	31.2
Eel River	Larabee 1	4.8	13.5	29.25
Eel River	Monument 2	5.3	23.0	37.8
Eel River	Strongs 2	6.9	45.3	53.1
Eel River	Bull 2	0	29.2	47.2
Elk River	LSF Elk 1	1.4	19.3	28.5
Elk River	NF Elk 1	5.3	35.9	61.4

TMDL standards used for comparison are recommended TMDLs of no more than 14% suspended fine sediment <0.85 mm, and no more than 30% fine sediment <4.7 mm in size. EPA recommended maximum logging road density is no more than 3.0 miles of road per square mile of land.

Information source: KRIS Coho CD (See Derksen 1998), compiling and synthesizing information from a wide variety of agency and other sources.